Agence spatiale canadienne | Canadian Space Agency

Canada

Earth Observation Express

Other Editions

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1. Canada's Response to the Earthquake in Haiti

On January 12, 2010, a strong earthquake measuring 7.3 on the Richter scale struck close to Port-au-Prince, Haiti. Significant aftershocks followed, the strongest with a magnitude of 5.9 on January 20. While the full extent of the damages has not yet been assessed, the earthquake has reportedly caused widespread loss of life and extensive damage to infrastructure. Canada is taking a leadership role in responding to this crisis. It has provided swift assistance in many forms, including humanitarian aid, search and rescue response, the provision of supplies and equipment as well as Canadian Forces military assets in support of relief efforts. Earth Observation (EO) satellites are key resources in a variety of disaster management scenarios. EO data has been used effectively in disaster responses such as earthquakes, tsunamis, floods, landslides, forest fires, and other natural or technological disasters. The ability to deliver data in near-real time is essential for relief operations to map and monitor damage and for assessing the impact on the future. To view a RADARSAT-2 composite products of Port-au-Prince (including a GeoEye-1 fusion products), Jacmel and Léogane, please visit: http://www.viasat-geo.com/eng/images_8R.asp. To view a satellite product, based on a GeoEye-1 50 centimeters resolution image of January 13th, showing multiple affected infrastructures in the Port-au-Prince region, please visit: http://www.viasat-geo.com/eng/images_8.asp. The products were developed by the Canadian company VIASAT GeoTechnologies, with the support of the Canadian Space Agency (CSA) Earth Observation Applications & Utilizations (EOAU) Divison. To view more RADARSAT-2 images of Haiti, please visit: http://gs.mdacorporation.com/news/press/2010/nr_r2_haiti_gallery_jan142010.asp.

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2. Critical Infrastructure Protection: Mitigation of Active Geohazard Sites in Eastern Canada With RADARSAT-2

Critical infrastructure consists of physical and information technology facilities, networks, services and assets that are critical to the well-being, operations and continuity of Canada. Canada's critical infrastructure is vulnerable to disasters, whether natural (e.g., pandemic, floods, landslides) or human-induced (e.g., terrorism, computer viruses). Radio-Canada has published a news on a

Canadian Space Agency (CSA) Government Related Initiatives Program (GRIP) project titled "InSAR monitoring of active Geohazard sites in Eastern Canada" (2009-2012). This project is conducted by NRCAN-CCRS, in close partnership with U. Laval (Dept. Eng. Geology), NRCAN-GSC, Transport Canada, Transport Québec, Chemin de fer Baie des Chaleurs, Geolgical Survey of NewFoundland and Labrador and College of North Atlantic - Corner Brook, NF. The main goals of the project are to demonstrate the capability of high-resolution InSAR data derived from RADARSAT-2 as an integrated geohazard monitoring tool for active geohazard sites affecting critical infrastructure in Eastern Canada and to build InSAR capacity within NRCAN/ESS, GSC labs in QC and Provincial Dept of Highways, and other partners to produce InSAR products. To read the news, please visit: http://www.radio-canada.ca/util/postier/suggerer-go.asp?nID=794259. To read the U. Laval communiqué, please visit: http://www.relationsmedias.ulaval.ca/comm/2010/janvier/universite-laval-realise-projet-etudes-geologiques-2371.html. For more information, please contact Vern.Singhroy@NRCan-RNCan.gc.ca; Francois.Charbonneau@NRCan-RNCan.gc.ca or Guy.Aube@asc-csa.gc.ca.

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3. Geoscience in the Canadian North: Operational Delivery of Predictive Regional Geological Mapping Products

Development of non-renewable resources in northern Canada represents one of the most important economic drivers to provide for the well-being of communities in the North and for the benefit of all Canadians. Although variable from year to year, the private sector annually invests hundreds of millions of dollars in mineral exploration in the three territories. In recent years, new diamond and gold mines are opening and environmental reviews are in progress for other base and precious metal deposits. Geoscience information is the cornerstone upon which much of these investment decisions are made. One of the roles of Natural Resources Canada (NRCan) is to supply information to stimulate and support exploration efforts. The availability and consistency of Earth observation (EO) satellite data sets enables similar geoscience products to be created in different regions of interest and over wider areas than ever before, making EO data an attractive source of information for decision-makers. Through the Canadian Space Agency (CSA) Government Related Initiatives Program (GRIP), NRCan, in close partnership with University and Industry partners, is producing various integrated geoscience maps products using RADARSAT, ASAR, hyperspectral and multispectral EO data sources in order to build expertise within the Canadian government (NRCan) for delivering program data and within industry clients who are the main users of government data in the resource exploration sector. For more information, please contact Paul.Budkewitsch@ccrs.nrcan.gc.ca.

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4. Ensuring The Safety of Canadians: Hazardous Ice Conditions Information Of Nunavut Derived From Canadian Earth Observation Satellites

The Government of Canada provides the most and accurate information about ice in Canada's waters and lands. It ensures the safety of Canadians, their property and their environment by warning them of hazardous ice conditions in

Canadian territorial waters; and provides present and future generations of Canadians with sufficient knowledge about their ice environment to support sound environmental policies. When people talk about "territory", they often speak in terms of land – and, that is the very name that was chosen for – Nunavut – "our land". This territory is more than land – it is the people on the land – who form the heart of what Nunavut is about. Nunavut communities are spread across one-fifth of Canada and yet are connected by cultural traditions that come from a common vision and a sense of belonging. The Foxe Basin is a shallow basin north of Hudson Bay in Nunavut, Canada, located between Baffin Island and the Melville Peninsula. This RADARSAT-1 and RADARSAT-2 mosaic of the Foxe Basin region captures the contrast of the icy shallower waters of Foxe Basin with the warmer deeper waters of the Foxe Channel in December 2009: http://ice-glaces.ec.gc.ca/content_contenu/images/Foxe_RsatMosaic_02Dec09.jpg.

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5. Global Security: Albania Benefits From Canadian Earth Observation Information During An Emergency Situation

Following the collapse of communism throughout eastern Europe in 1989, Albania has faced a number of challenges in its political and economic transition process. Albania's over-arching foreign policy priority is a full integration with Euro-Atlantic institutions. There is no official Canadian development assistance program in Albania, but the Canadian International Development Agency operates a local "Canada Fund" facility to support projects delivered by Albanian civil society organizations. On January 4 2010, unprecedent rains and unusual warm weather causing widespread flooding. in the northwest regions of Albania. Hundreds of Albanians were evacuated from the flood zones. Canadian Earth Observation (EO) satellites, such as RADARSAT-1 and RADARSAT-2, are key resources in all phases of the disaster management cycle (i.e. mitigation, preparedness, response, recovery). Archive imagery has been delivered to Albanian and regional emergency authorities to better manage the flood. To view a RADARSAT-1 and RADARSAT-2 flood extent product (January 9, 2010) of the Shkoder region of Albania, please visit: http://www.disasterscharter.org/web/charter/activation_details?p_r_p_1415474252_assetId=ACT-286.

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6. eSPACE: emergency Spatial Pre-SCAT for Arctic Coastal Ecosystems

Many Canadian Federal Departments have functional security and emergency preparedness responsibilities that pertain to, or are affected by, shipping activity in Arctic Canada. Environment Canada (EC) Wildlife and Landscape Science Directorate and the Environment Emergencies Section have an important role in terms of preparedness for a potential environmental emergency along the coastlines; however there is a significant information gap in the Arctic Region. The Arctic presents different challenges and its geography is impressive. There are many opportunities for economic development in the north, many of which involve activities that increase the risk of an incident that may impact local populations and the fragile ecology. Increased exploration activities, increased shipping traffic and climate change are three majors reasons why EC intends to initiate a national project in Canada's north to

improve emergency preparedness and response. The eSPACE project, developed via the Canadian Space Agency (CSA) Government Related Initiatives Program (GRIP), is part of a new joint initiative from the CSA called MORSE - Arctic Coastal Initiative (http://www.morsearctic.net/). The initiative focuses on information needs of Arctic coastal ecosystems that can be satisfied by Earth Observation (EO) data from satellites. eSPACE is an multi-agency project to develop and demonstrate the use of EO data for emergency preparedness and response and habitat conservation in Canada's northern coasts. Expected results and outputs of eSpace are: (1) spatially explicit coastal sensitivity and segmentation of shoreline maps for the 3 study sites in northern Canada; (2) improved capacity to use EO resources to support EC's mandate in the Arctic; (3) business case for full implementation of satellite coastal mapping for emergency preparedness and habitat conservation in Canada's north. For more information, please contact: Jason.Duffe@ec.gc.ca, Sonia.Laforest@EC.GC.CA or Yves.Crevier@asc-csa.gc.ca.

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7. Ensuring Safe and Environmentally Sustainable Northern Development: MacKenzie Delta Under Surveillance

The Mackenzie Corridor and Mackenzie Delta, in Canada's Northwest Territories (NWT), contain large discovered hydrocarbon reservoir. Recent discoveries in both areas suggest that there may remain substantial, undiscovered reserves. The region includes the right-of-way for the proposed Mackenzie Valley Pipeline, which is expected to encourage socio-economic activities in Canadian northern remote communities. The long term effect of these activities is not known, but attempts have been made by Natural Resources Canada (NRCAN) Geological Survey (GSC) to develop tools and technology to monitor this region and ensure safe and environmentally sustainable development and preservation of natural habitats and wildlife. The Mackenzie Delta region is of most interest because of the on-going Mackenzie Gas Project, which proposes to develop natural gas fields in the Canada's NWT and deliver the gas to markets through a pipeline system. Through the Canadian Space Agency (CSA) Earth Observation Application Development Program (EOADP), C-CORE, in close collaboration with GSC, is developing new Earth Observation (EO) satellite interferometric-based products using RADARSAT-2 to help monitor current and future developments in the Mackenzie Delta region. The specific EO applications areas for this project are: bottom-Fast Ice (BFI) delineation using coherent repeat-pass scenes; baseline Digital Elevation Model (DEM) generation of the Delta pre and post flood-surge events; subsidence mapping through conventional and/or permanent scatterer InSAR (PSInSAR) techniques. GSC will also performs a variety of topographic and geotechnical surveys and partners with Environment Canada on water level-monitoring and hydrology. At the end of the project, C-CORE will have defined the scope of an operational service to provide InSAR products for monitoring northern sites. For more information, please contact joseph.chamberland@c-core.ca or yann.denis@asc-csa.gc.ca.

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8. SENTINEL NoRTh

The Sentinel programme was developed by the European Space Agency (ESA) within the Global Monitoring for Environment and Security (GMES) framework of the European Union. Sentinel corresponds to 5 pairs of operational polar orbiting

satellite platforms. Sentinel 1a, 2a and 3a, with relevance to terrestrial monitoring, have launch dates tentatively scheduled for the last quarters of 2011 (1a) and 2012 (2a, 3a). The Earth Observation (EO) satellite sensors have been confirmed to allow for at least 15 years of continuous coverage. Canada, as an associate member of the ESA, has the ability to influence the design and operation of these missions and also to receive and use data from the sensors on the satellites. Through the Canadian Space Agency (CSA) Government Related Initiatives Program (GRIP), Natural Resources Canada (NRCAN) Canada Centre for Remote Sensing (CCRS), in close collaboration with the Canadian Forest Service (CFS), Agriculture and Agrifood Canada (AAFC), the Universities of Lethbridge, York and Nebraska, will perform the necessary research and development to ensure EO data and information continuity from current and feature moderate resolution visible and infrared sensors used by the Government of Canada.Sentinel-2 and Sentinel-3 offer new opportunities for enhancing information content using the improvements in spatial, temporal and spectral resolution expected with these Sentinel missions. For more information, please contact Richard Fernandes (NRCAN-CCRS: 613-947-1292), Rasim Latifovic (NRCAN-CCRS: 613-947-1816) or Paul Briand (CSA: 450-926-6737).

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9. New Call For Sentinels 4 and 5

The series of 'Sentinel' Earth Observation (EO) satellites is developed by the European Space Agency (ESA) within the framework of the GMES (Global Monitoring for Environment and Security) initiative. GMES is the European Initiative for the establishment of a European capacity for EO. ESA recently announced a call for Mission Advisory Group members for the missions of Sentinel 4 and 5. The main objective of both satellites is to provide data for atmospheric composition monitoring. Applications can be made via the following website: http://missionadvice.esa.int/Sentinel/. The deadline for submission is 15 February 2010.

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10. Call For Proposals: Science and Operational Applications Research – Canadian Provinces and Territories (SOAR-CPT)

Canada has a long and proud tradition of excellence in research and scientific achievement. SOAR-CPT is a Government of Canada initiative aiming at Canadian provinces and territorial governments. Its purpose is to support scientists in the development of applications using the RADARSAT-2 Earth observation satellite and to promote the use of synthetic aperture radar (SAR). Proposals for basic and applied research leading to the development of applications using the new modes of RADARSAT-2 are requested. To participate and to submit your proposal, please visit www.asc-csa.gc.ca/eng/programs/soar/default.asp or contact the Canadian Space Agency's SOAR Coordination Office : 450-926-6749, SOAR-CPT@asc-csa.gc.ca.

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11. National SAR Winds Workshop

Environment Canada is responsible for providing environmental information for

the benefit of Canadians, including forecasts and warnings concerning their safety, security, and economic well-being. Many services provided by EC's Meteorological Service require detailed knowledge of the coastal marine environment. Those that depend directly on knowledge of the surface wind field include marine forecasting and warning, forecasting the movement of sea and lake ice, predicting storm surges and the evolution of pollution episodes, as well as understanding and predicting the processes affecting marine ecosystems and fish populations. With support from CSA's Government Related Initiatives Program (GRIP), Environment Canada has a 2-year project to assess the utility of SAR-derived wind information for nation-wide marine operational forecasts and analysis. Key objectives of this project are to develop the business case and implementation strategy for an operational SAR winds program. A workshop on SAR winds was held in Ottawa on November 5-6, 2009 which brought together managers, forecasters, and scientists from across Canada, as well as a representative from the US National Oceanic & Atmospheric Administration (NOAA). The objectives of the workshop were to better understand the user requirements and drivers, provide a forum for the exchange of information and encourage coordination and synergy, and focus efforts towards the goal of operationalization. Breakout sessions and plenary summaries took place related to User Requirements and Training, SAR Data Ordering Coordination, Science Advancements, and SAR Wind Prototype Implementation. For more information, please contact Vladimir Zabeline (vladimir.zabeline@ec.gc.ca) or Dean Flett (dean.flett@asc-csa.gc.ca).

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12. Northern Strategy: Safeguarding Canada's Sovereignty in the Arctic With Earth Observation

Canada's sovereignty and security in the Arctic remains a top priority for the Canadian government and is an important aspect of Canada's Arctic foreign policy. The Canada First Defence Strategy will help the country's military take action in exercising Canadian sovereignty in the North. Canada's sovereignty over the lands and waters of the Canadian Arctic is long-standing, well-established and based on historic title. The Nares Strait is a waterway lying between Ellesmere Island (Nunavut, Canada) and Greenland. It links Baffin Island with the Lincoln Sea in the Arctic Ocean. To view a RADARSAT-2 and AMSR satellite product of the region from January 2 20010, including Ellesmere Island, Petermann Glacier, Kane Basin and Hans Island, please visit: http://ice-glaces.ec.gc.ca/content_contenu/images/jan2010_nares_radarsat2_amsr.jpg.

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13. Understanding and Adapting to Climate Variability and Change: Canadian Ice Cap and Glacier Monitoring From Space

The question of whether global climate change is causing the polar ice caps to shrink is one of the most hotly debated environmental issues we currently face. By monitoring precise changes in the thickness of the polar ice sheets and floating sea ice from space, CryoSat-2 aims to answer this question. Ice caps and glaciers occupy 150,000 km2 of the Canadian Arctic Islands which, collectively, represents the largest area of land ice outside of the Greenland and Antarctic ice sheets. Another 50,000 km2 covers Canada's western and Northern Cordillera. These land ice masses contribute significantly to sea level change and river flow. The thickness and extent of marine icefields (sea ice) is

also a critical aspect of Arctic marine ecosystem functioning, the global climate system, marine navigation and related sovereignty and environmental protection issues. Through the Canadian Space Agency Government Related Initiative Program (GRIP), Natural Resource Canada (NRCAN) is developing a better capacity to study cryosphere fluctuations and their impacts in Nordic Canada using the future CryoSat-2 altimeter SIRAL. The new project, titled "Canadian Cryosphere Cryosat Applications", will contribute to policy development, technical demands, strategic demonstration and operationalization of Cryosat-2 in the context of Canada's Frontier Surveillance Strategy. After launch in early 2010, Devon Ice Cap in the Canadian Arctic and the Columbia Icefield in the Canadian Rockies will serve as two of the glacier calibration/validation sites for Cryosat-2. The Lincoln and Beaufort Seas will provide cal/val for marine ice measurements. For more information about this GRIP project, please contact guy.aube@asc-csa.gc.ca, mike.demuth@nrcan-rncan.gc.ca, david.burgess@nrcan-rncan.gc.ca and christophe.kinnard@ceaza.cl. For more information on Cryosat-2, please visit: http://www.esa.int/esaEO/SEM03Q2D62G_index_0.html. For more information on Canada's land ice surveillance strategy, please visit: http://pathways.geosemantica.net/WSHome.aspx.

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14. Cryosat-2 Launch Event

ESA Ice Mission CryoSat-2, the next of the Earth Explorer satellites, is scheduled for liftoff on 25 February 2010 from the Baikonur launch site in Kazakhstan. You are invited to follow the launch during the Cryosat launch event, starting at 11:30, in ESA/ESOC, Darmstadt, Germany. For more information, please contact Melanie.Zander@esa.int or visit www.esa.int/cryosat.

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15. Encouraging Partnerships In Strategic Areas Of National Interests: Environmental Science and Earth Observation Technologies For Sea Ice and Glaciers Changes

The Government of Canada is supporting science and technology collaboration involving the business, academic, and public sectors, at home and abroad. Partnerships are essential to lever Canadian efforts into world-class successes and to accelerate the pace of discovery and commercialization in Canada. Through partnerships, the unique capabilities, interests, and resources of various and varied stakeholders can be brought together to deliver better outcomes. Canada's federal government focuses strategically on research in areas that are in the national interest from a social and economic perspective (i.e. environmental science and technologies; natural resources and energy; health and related life sciences and technologies; information and communications technologies). Sea ice and glacier, as dominant features of the northern landscape, are critical to sustaining life in the North. They provide transportation routes, wildlife habitats, access to marine resources and recreational activities for Northerners. But climate change is rapidly changing the face of the North. Dramatic changes to northern waters and ice conditions are threatening the overall way of life for northern communities. Monitoring environmental changes in glacial ice is becoming more and more important as we see an increasing rate of sea level rise and depletion of fresh water

resources. The Canadian Government needs information on the current state of the cryosphere for the mitigation of anticipated future environmental change. Increased use of Canadian Earth Observation (EO) resources represents an efficient and straightforward way of strengthening our understanding of Canadian ice changes. Through the Canadian Space Agency (CSA) Earth Observation Applications Development Program (EOADP), Noetix Research, in close partnership with NRCAN-CCRS, NRCAN-GSC, EC-CIS and Parks Canada, is developing a project that focuses on the use of the RADARSAT-2 EO satellite data over glaciers and fast ice. The objective is to improve the extraction of useful geophysical information of glaciers, ice caps and land ice from RADARSAT-2 InSAR data. The output of this project will have a direct benefit to federal and territorial governments, people in the northern communities, sea ice analysis and glaciologists. The output of the fast ice work will be of direct benefit to the users of the Floe Edge Service which is delivered in collaboration with the EC-CIS to northern communities.

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16. RADARSAT-2 Improvements to Enhance Earth Observation Applications and Utilizations

RADARSAT-2's revolutionary design enables the satellite flexibility to be up-dated, reconfigured and additional beam modes added to accommodate the world's ever changing needs. Since its launch in 2007, the following up-dates have been made: The Licence for RADARSAT-2 restrictions on beam mode resolution were relaxed, with the beam modes now matching the full resolution of the current RADARSAT-2 beam modes. What this entails is that certain users can now receive finer resolution products for the Spotlight, Ultra-Fine and Quad-Pol beam modes Additional Ultra-Fine beam options covering incidence angles from 20 to 30 degrees are now part of the RADARSAT-2 offerings, which permit the use of the fine beam mode for a greater range of applications including oil seep and oil spill detection, as well as greater revisit options improving fine beam mode monitoring capabilities. A single-look complex product from the Multi-look Fine beam mode is now available, providing approximately 5 metre resolution across a 50 kilometre swath. This presents a unique combination of wide area coverage and high resolution for improved mapping, target and change detection capabilities. Changes were made to the beam modes, pulses and timing parameters on the satellite, as well as to the processing of the imagery on the ground, which removes low level artefacts and ambiguities from the imagery to improve image quality and usability of the imagery. These improvements are particularly evident in the Spotlight, Ultra-Fine and Quad-Pol images. RADARSAT-2 continues to maintain its position as the world's most advanced commercial C-Band Synthetic Aperture Radar satellite with more exciting upgrades and changes to come in 2010. Please visit the following websites for more information on RADARSAT-2: www.radarsat2.info or www.asc-csa.gc.ca/eng/observation/applications.asp. Purchasing RADARSAT-2 data: gs.mdacorporation.com.

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17. Acquisition of MIR Télédétection Inc.

The Canadian company VIASAT GeoTechnologies, which designs, develops and implements geospatial solutions, has signed an agreement to acquire the operations of MIR Télédétection, which is involved in Earth Observation applied

to mineral potential assessment, hydrocarbon exploration and environmental monitoring. For more information, please visit: http://www.viasat-geo.com/eng/communiques.asp?comm=27.

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18. Understanding Natural Variability In The Climate System With Earth Observation

The Government of Canada supports efforts to protect the environment by developing policies and programs, conducting scientific research, and working with other government departments, the provinces, territories and international partners in the fight against climate change. Understanding the natural variability of the Earth's climate system is important to better understand the impacts of our changing climate and its effects on Canadians and their environment (land, water, air). In close partnership with Environment Canada (EC) and the York University, the Canadian Space Agency (CSA) is developing a project titled "Understanding Natural Variability In The Climate System". The main objective is to obtain a better understanding of the effects that variabilities in the Sun would have on the climate of the Earth by using state of the art numerical models combined with Earth Observation (EO) satellite information (ENVISAT/GOMOS, OSIRIS, SAGE, SBUV). Early results shows that although the effect of solar energetic particles precipitation is mostly confined to the polar ice cap, its impact on composition will result in changes on atmospheric circulation (the Brewer-Dobson circulation) and will affect temperatures and water vapour trough the tropical tropopause. For more information, please contact Stella.Melo@asc-csa.gc.ca.

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19. New Earth Observation Applications Toolbox: NEST

Firms large and small are bringing innovations into our lives, whether in the form of new technologies to address environmental problems, new products to make our homes, schools, and businesses more comfortable and energy efficient or new therapies to improve the health and well-being of Canadians and world populations. The Canadian company Array Systems Computing Inc. (Toronto, Ontario) is developing the Next ESA SAR Toolbox (NEST) for satellite image analysis and exploitation. The new tool is a user friendly open source toolbox for reading, post-processing, analyzing and visualizing the large archive of satellite Earth Observation (EO) data (from Level 1) from RADARSAT-1, RADARSAT-2, ENVISAT-ASAR, ERS-1, ERS-2, JERS-1, TerraSAR-X, ALOS PALSAR, Cosmo-Skymed and the future Sentinel-1 as well as common EO file formats including GeoTiff, HDF 4 & 5, NetCDF, and CEOS. NEST will help the EO community by supporting the handling of various SAR products and complimenting existing software packages. For more information about NEST, please visit: http://earth.esa.int/nest.

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